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SYSTEMS OF LIVESTOCK FARMING

IN THE BLACK PRAIRIE BELT OF ALABAMA & MISSISSIPPI

THE BLACK PRAIRIE BELT of Alabama and Mississippi is in a period of uncertainty as to the best kind of farming to carry on. Low prices for cotton, continued boll-weevil damage, and the spread of Bermuda and Johnson grasses have made cotton production extremely hazardous.

With the natural adaptability of the soil to the production of forage crops, and a large portion of the land capable of being made into excellent pastures, livestock production seems to offer one means of more fully utilizing the natural resources of the area.

Systems of farming in which dairying and beef production, the principal livestock enterprises, and early-lamb production, the secondary livestock enterprise, are combined with the production of Johnson grass hay and a limited amount of cotton, are outlined in this bulletin.

This bulletin was prepared by the Bureau of Agricultural Economics in cooperation with the Alabama Polytechnic Institute and the Mississippi Agricultural Experiment Station. The farm data used were secured under the direction of J. C. Grimes, head, animal husbandry department, Alabama Polytechnic Institute, and Lewis E. Long, research economist, Mississippi Experiment Station.

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SYSTEMS OF LIVESTOCK FARMING IN THE BLACK PRAIRIE BELT OF ALABAMA AND MISSISSIPPI

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DESCRIPTION OF THE AREA

LOCATION AND EXTENT OF THE AREA

THE BLACK BELT or Black Prairie Belt of Alabama and Mississippi is a crescent-shaped strip of land, with an approximate average width of 30 miles. (Fig. 1.) The principal black belt counties have a total area of approximately 6,500,000 acres. Less than half of this area is typical prairie-belt land, but these counties have become generally known as the "black belt counties" or "prairie belt counties" owing to the fact that their earliest and most extensive agricultural development took place largely in the black prairie-land sections. This Black Prairie Belt lies entirely within the coastal plain region, but it possesses certain physical characteristics that make it a region distinctly apart from the rest of the coastal plain in so far as agricultural practices and possibilities are concerned.

SOILS OF THE BLACK PRAIRIE BELT[1]

Soils of the Black Prairie Belt may be roughly placed in two general groups—lime soils and nonlime soils. This entire belt is underlain

[1] BENNETT, H. H., and CROSBY, M. A. SOILS OF THE PRAIRIE REGIONS OF ALABAMA AND MISSISSIPPI AND THEIR USE FOR ALFALFA. U. S. Dept. Agr. Rpt. 96, 48 p., illus. 1911.
For detailed discussions of the soils, topography, drainage, etc., by counties, see soil survey reports of the Bureau of Soils, United States Department of Agriculture.

with a stratum of highly calcareous material consisting largely of "rotten" limestone known as Selma chalk. The lime soils are either directly or indirectly derived from this underlying limestone, whereas the nonlime group is supposedly of different origin. Soils of the lime group are usually richly impregnated with calcium carbonate, whereas some of the nonlime soils are excessively acid, even though underlain at a depth of only 1 to 2 feet by the Selma chalk. The lime soils belong to the Houston series, the most important being classified by the United States Bureau of Soils as Houston clay and

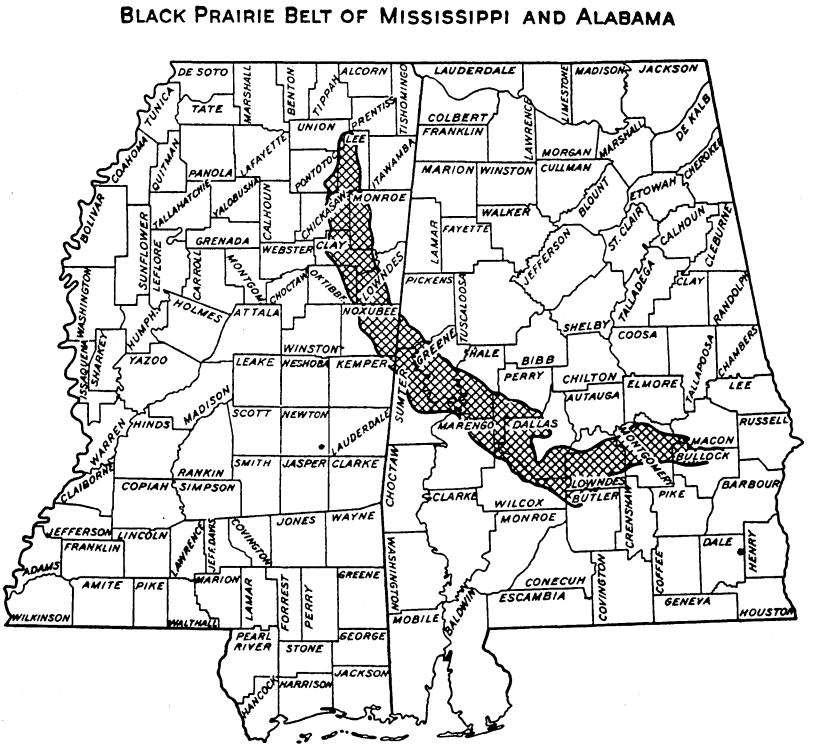

FIG. 1.—Shaded area shows location of the Black Prairie Belt in Mississippi and Alabama

Trinity clay. In the nonlime group are included the Oktibbeha, Susquehanna, Ocklocknee, Orangeburg, and Bibb types.

The lime soils are mainly clays and heavy clay loams. They were originally very fertile and productive. To a large extent they still remain so but years of continued cropping to corn and cotton with no thought given to the maintenance of soil fertility have deprived many fields and even larger areas of much of their original productivity. These soil are admirably adapted to the production of grasses and legumes which makes it easily possible to bring them back to something like their original producing power.

The nonlime soils vary all the way from sandy loams to stiff, impervious clays. The heavy loams and clays are good grass soils and

suitable for the growing of such legumes as cowpeas, soy beans, and Lespedeza. Such soils as contain a goodly supply of organic matter will produce fair yields of corn and cotton; the loamy types are better suited to cotton, one year with another, than the heavy lime soils.

In general the majority of both lime and nonlime soils of the Black Prairie Belt are well suited to the production of feed and grazing crops; this gives this area greater potential possibilities for economical livestock production than may be found in any other section of the coastal plain region.

AGRICULTURE OF THE AREA

Agricultural development of the Black Prairie Belt began early in the ninteenth century, the first settlers coming mostly from Virginia, the Carolinas, Georgia, and Tennessee. The fertility of the soil and the ease with which the open prairie lands could be brought under cultivation attracted a wealthy class of settlers, with the result that plantations ranging from 1,000 to several thousand acres in extent were common. Many of these large plantations have since been divided into smaller ones, through sale or the division of estates, but the area is still one of comparatively large holdings.

Cotton has always been the dominant crop over much of the Black Prairie Belt, and from 1839 to 1910 this was the outstanding cotton-producing section of Alabama and eastern Mississippi. In the early days when there was an abundance of slave labor the plantations were in the main self-supporting, for although cotton was from the first the principal source of revenue and the organization on the majority of plantations centered around the production of this crop, each plantation usually produced its own supply of feed and foodstuffs.

After the Civil War the tenant system came into vogue, and the trend was more and more toward a one-crop system, with the result that the production of home supplies diminished and an increasing amount of feed and foodstuffs was purchased. From 1910 to 1920 the cotton acreage in the prairie-belt counties declined from 1,339,450 to 686,196 acres, a decrease of over 48 per cent, and during the same time the production decreased from 334,599 to 128,599 bales, a reduction of over 61 per cent, according to census figures. This decrease in acreage and the still greater decline in production were due to the boll-weevil infestation, which began in 1911, and to a lesser extent to the spread of Bermuda and Johnson grass over considerable acreages of the most fertile land.

Another factor contributing to the decrease in cotton acreage was the development of alfalfa production, which took place during this period. The production of alfalfa and the utilization of Johnson grass for hay resulted in an increase of 128 per cent in the acreage of hay and forage crops; and of the total acreage of crops harvested, hay and forage crops increased from 4½ per cent in 1910 to 13 per cent in 1920. During this same decade following the eradication of the cattle or Texas-fever tick, considerable attention was given to the production of cattle, and the total number of cattle rose from 261,881 head in 1910 to 331,503 in 1920, an increase of over 26 per cent. A considerable portion of this increase was in beef cattle, and in 1920 the Black Prairie Belt had some of the finest herds of beef animals to be found in the South.

The sharp break in cattle prices in 1921, together with the fact that cotton maintained a satisfactory price level from 1922 to 1925, resulted in the disposal of a large portion of the beef cattle and the breaking up and planting to cotton of much of the land on which meadows and pastures had been established. From 1920 to 1925 the cotton acreage in the black prairie counties increased about 12 per cent and cotton production for the same period increased over 60 per cent, largely as the result of lessened boll-weevil damage and of bringing under cultivation land that had been in alfalfa or pasture for several years. For the same period the acreage in hay and forage crops decreased 17 per cent, and the total number of cattle decreased over 16 per cent. This reduction in total cattle involved chiefly the beef animals, as the number of dairy cows showed only a slight decrease.

LAND UTILIZATION

The black prairie counties of Alabama and Mississippi have a total area of 6,498,560 acres. Census figures for 1880 show 4,961,312 acres, or 76 per cent of the total acreage to be in farms. This was the peak in so far as acreage in farms was concerned, and, except in 1900 when there was a slight increase over the 1890 figures, there has been a gradual and uninterrupted decrease from the amount of land in farms in 1880. The 1925 figure was 3,709,616 acres, a decline of over 25 per cent in 45 years. The year 1910 showed the greatest amount of improved land in farms, a total of 2,861,357 acres. By 1925 the amount of improved land had declined to 2,307,539 acres. Acreage of crops harvested reached the highest point around the beginning of the present century, as census figures for 1900 give a total of 2,109,001 acres. Since that time there has been a steady decline in acres of crops harvested. The 1925 figure was 1,497,128 acres, a decrease of 29 per cent in 25 years.

FARM ORGANIZATION

From 1880 to 1910 there was but little change in the plantation organization of the Black Prairie Belt. During this period cotton produced practically all the revenue; grain and forage were grown only to supply the requirements of work stock. Cotton occupied about 60 to 64 per cent of the land that was in crops, and corn occupied from 26 to 35 per cent. These two crops normally accounted for 90 to 95 per cent of the total crop acreage. Hay and forage crops, occupying less than one-half of 1 per cent of the crop acreage in 1880, had increased to nearly 5 per cent by 1910, whereas the acreage devoted to small grains, chiefly oats, declined from 4 per cent of the total crop acreage in 1880 to only 1.5 per cent in 1910.

The 10-year period from 1910 to 1920 witnessed many radical changes in the agriculture of the Black Prairie Belt. The acreage of harvested crops decreased by 18 per cent, and there was a general shifting in the relative importance of crops and enterprises. Cotton dropped from 64 to 41 per cent of the crop acreage, whereas the percentage of corn increased from 26 to 39 per cent. Hay and forage crops increased from 4.5 to 13 per cent of the crop acreage, largely as the result of continued spread of Johnson grass and increased attention to alfalfa production. During this decade the population of the black belt counties decreased by 43,388 persons, a

decline of 8.5 per cent. This was chiefly due to the migration of farm labor to manufacturing centers where high wages were obtainable. The marked decline in cotton production during this period resulted from several causes. In the main these were the low prices paid for cotton in 1914, boll-weevil depredations, labor shortage, and increased production of livestock and market hay.

From 1920 to 1925, as a result of satisfactory cotton prices and a temporary decrease in boll-weevil damage, there was a decided shift back toward the old order. In 1925 cotton occupied 51 per cent of the acreage of harvested crops, and the percentage occupied by corn and hay and forage had decreased slightly.

POSSIBILITIES FOR AGRICULTURAL READJUSTMENT

Under present conditions it appears that less cotton production and the expansion of other enterprises is essential if a proper economic balance of the agriculture of the Black Prairie Belt is to be maintained. Cotton production has become extremely hazardous except under most favorable conditions. The boll weevil is a constant menace. Successful cotton production under boll-weevil conditions necessitates an early and rapid growth of the crop, and these heavy clay soils do not normally permit of as early planting or as frequent and rapid cultivation as is possible on the lighter soils. Furthermore, on land infested with Bermuda or Johnson grass the extra labor required in cultivation and hoeing greatly increases the cost of production. A total abandonment of cotton is not recommended, as the majority of farms are organized for the production of this crop, and changes in organization should not be too radical. It is obvious, however, that a material reduction in the cotton acreage and the substitution of other enterprises will prove a lasting benefit to the region as a whole.

During the summer of 1926 records of the farm business for the year 1925 were secured from 63 livestock farms in this section. Additional information was secured from county agents, bankers, creameries, condenseries, ice-cream manufacturers, livestock buyers, and others. The object of this survey was to determine to what extent, if any, an expansion of the production of livestock and livestock products might safely be recommended. A careful analysis of the situation indicates that the expansion of certain enterprises already partly established in this section offers the safest means of bringing about a proper agricultural readjustment. The following enterprises appear to offer greatest possibilities: (1) Increased production of market hay; (2) further expansion of the dairy industry; (3) further expansion of the production of beef cattle; and (4) sheep raising, primarily for the production of early lambs.

JOHNSON GRASS HAY AS A CASH CROP

The production of hay, both for the farm needs and for market, is an enterprise that will fit nicely into the organization of a much larger number of farms in the Black Prairie Belt than now make use of it. Every farm should produce its own forage and on the majority of farms the production of hay for the market may well go hand in hand with any of the various livestock enterprises adaptable to the section. The extensive acreages of fertile land

that are already set with Johnson grass can not, under present conditions, be economically devoted to the production of intertilled crops; hence it is obvious that far better returns may be looked for from their utilization for the production of hay. Moreover, the production of hay may be materially expanded without any considerable increase of capital.

Production of Johnson grass hay for the market has already attained considerable magnitude in this section, and on some farms it is the principal enterprise. It will stand considerable expansion, however, for the present total production falls far short of supplying the demands of such easily accessible markets as Birmingham, Atlanta, and other smaller cities, and the lumber camps of western Florida, southern Georgia, Alabama, and Mississippi.

There are possibilities of greatly improving the methods of marketing this hay. Standard grades have been established in recent years which have helped to put the various grades of this hay on an equal price basis with other hays of comparable quality. But, during the winter, when the demand for hay is greatest, many of the roads may be impassable, and hay stored on the farm can not be moved. When the roads become passable a large volume of hay is moved to shipping points, causing temporary gluts on central markets. A study of this situation should be made with a view of determining the feasibility of storage warehouses at shipping points or of other possible remedies. Another consideration is the large quantity of low-grade hay that is put up at the present time. More careful methods of harvesting will eliminate a large part of this class of hay, but even under efficient methods there will be a considerable proportion of low-grade hay as a result of weather damage. The livestock systems outlined in this bulletin will utilize this class of hay to advantage.

At the present time Johnson grass is the most important hay crop of the Black Prairie Belt. Between 1910 and 1920 there was considerable expansion of alfalfa production, and for a time this crop gave promise of becoming a dominant enterprise on the lime soils of the area. During recent years, however, much trouble has been experienced in maintaining stands of alfalfa on these soils, and many extensive plantings of the crop have failed. The cause of this trouble is as yet unexplained. For this reason a general expansion of alfalfa production in this area is not to be recommended—at least not until a means of controlling this trouble is worked out—and the expansion of commercial hay production should be confined largely to Johnson grass.

Johnson grass hay production may be increased in two ways: (1) By converting fields badly infested with Johnson grass into meadows, instead of cultivating such land at a loss, and (2) by better management of existing meadows. Considerable acreages of Johnson grass land have been planted to cotton during the past two years. Much of this has resulted in a loss to the farmer, even with good prices for cotton. Obviously such land should yield a profit if devoted to the production of hay. A decline from the high prices that farmers received for their hay from 1917 to 1920 caused many good Johnson grass meadows to be neglected during the past five years. As a result, stands have become thin, yields have declined, and many meadows have become so weedy that an increasing proportion of low-grade hay is produced.

FIG. 2.—A good crop of oats is a decided asset to livestock farming. This field produced a yield of over 60 bushels to the acre

An established practice with some Johnson grass hay producers is to plow up a portion of their meadows in September or early October each year and sow to oats, or a combination of oats and vetch or Canada peas. This practice stimulates the growth of Johnson grass and helps to eliminate weeds. Where oats alone are sown they can be cut for hay the following spring or left to mature for a grain crop. The latter method gives the farmer a valuable grain crop (fig. 2) and usually two cuttings of hay after the oats are harvested. Where a combination of oats and vetch or Canada peas is sown this crop is usually cut for hay.

A good stand of Johnson grass in the black prairie should annually produce at least three cuttings, yielding a total of 2 to 3 tons of hay per acre, and much better yields are frequently secured on some of the more fertile areas. (Fig. 3.) An annual yield of 2

FIG. 3.—On fertile soil a well-managed Johnson grass meadow will annually produce a heavy tonnage of hay. This field produces four cuttings each year, with an aggregate yield of 4 tons to the acre

FIG. 4.—By building a stack with the use of push rakes and a stacker a large quantity of hay can be handled rapidly and efficiently by a comparatively small crew. Hay properly cured and put up in large, well-made stacks results in the best quality of product

to 3 tons of hay per acre will usually net a greater return than could be secured from cotton on the same land.

At present, far too much low-grade hay is shipped to market, and for this reason there is need of greater care in hay making in order that a larger amount of better-grade market hay may be produced. This low-grade hay results from weedy meadows, from allowing the grass to become woody and overripe before cutting, from baling before the hay is properly cured, and from careless methods of storing and shipping. The large amount of low-grade hay that is now put up in this section may be materially reduced by better care of the meadows, by cutting at the proper time, and by adequate care in curing, baling, and storing. (Figs. 4 and 5.)

Suggested systems of farming that include the production of market hay will be found on pages 25 to 34, inclusive.

FIG. 5.—Topping out a stack that has been made with push rakes and a stacker

LIVESTOCK PRODUCTION

PASTURE AS A BASIS FOR LIVESTOCK PRODUCTION

An abundance of cheap and nutritious grazing is the first requisite of successful livestock production. Good pasture is usually the cheapest and best feed for all classes of farm animals, and without good grazing but few livestock enterprises may be expected to return a profit. The dairyman needs good pastures for the economical conduct of his business. Under many conditions milk may be produced in greater abundance and much more cheaply on good pasture and a small amount of concentrates than on dry roughage or silage and a maximum grain ration. Likewise, good pasture is essential to the economic production of meat animals, and beef or mutton producers can not hope to succeed without an abundance of cheap grazing. Gains made on pasture are produced at a much lower cost than are those made with dry roughage and grain feeds.

The proportion of the farm that should be in grazing depends upon the carrying capacity of the pasture and the relative importance of livestock as compared with other enterprises. Where some phase of livestock production is the principal enterprise, it is obvious that more grazing land is required than where crop enterprises dominate the farm organization. On farms where dairying is the main enterprise and crops are grown solely for feed, the best organization appears to call for approximately 40 per cent of the land in pasture. Farms that have dairying as the major enterprise, with sheep, hay, and a small amount of cotton as minor enterprises, need to have about one-third of the land in pasture. Beef-cattle production is largely a grazing proposition, and for this reason calls for a greater acreage of pasture than does dairy farming. The better-organized beef-cattle farms have 60 per cent and upward of the land in pasture, the acreage depending largely upon whether minor cash-crop enterprises are included in the farm organization.

There is probably no section of the South that comes so near to meeting the pasture requirements of the livestock grower as does the Black Prairie Belt of Alabama and Mississippi. This section is particularly fortunate in that it lies within the distribution range of practically all the desirable pasture plants known to the cotton-growing States. Furthermore, the soil and climatic conditions are such that it is admirably adapted to the production of a large variety of grasses and both summer and winter legumes, thus offering pasture combinations of highly nutritious plants that will furnish grazing for 10 to 12 months of the year. These advantages, combined with relatively cheap land, mean low grazing costs and offer exceptional opportunities for the economical production of livestock and livestock products.

At present, a number of excellent pastures are already established in the Black Prairie Belt. In the main these are more accidental than otherwise, few having been established with any preconceived thought or design; yet they serve to exemplify the exceptional grazing possibilities of the section. These pastures have been formed largely by aggressive grasses that have forced the abandonment of cultivated fields. They consist mainly of Bermuda grass, Dallis grass or paspalum, Johnson grass, white clover, black medic, sweet

clover, bur clover, hop clover, Lespedeza, carpet grass in some localities, and native grasses, principally broom sedge. With the exception of broom sedge and a few other native grasses of low grazing value, most of these pasture plants have been brought in by accident rather than with thought of pasture improvement.

In addition to the many excellent pastures already in existence there is an immense acreage of potential grazing in the large and constantly increasing acreage of land lying idle and unproductive because it is more or less infested with Bermuda or Johnson grass. Such land may be easily converted into good pastures, and the utilization of this idle land for grazing will do much to put the section on a better economic basis and help to offset the recurring hazard of the one-crop system that has so long had a "strangle hold" on the farmers of the Black Prairie Belt.

Bermuda grass is the foundation of most of these pastures. It has established itself by gradually encroaching on cultivated fields until they have been abandoned as far as the production of intertilled crops is concerned. Bermuda grass alone will furnish good grazing between frosts, which in this section means from seven to nine months of the year. Owing to the difficulty of eradicating Bermuda grass, its introduction on good, clean crop land is not to be recommended, but fields in which it is so well established as to interfere materially with the production of cultivated crops may usually be utilized for pasture more economically than they can be used otherwise.

Dallis grass, or paspalum, has spread rapidly in many sections of the Black Prairie Belt during the last 10 or 12 years. It is not hard to eradicate; hence its spread has been confined largely to pastures and idle land. Dallis grass thrives on practically all the soils of this section. It makes a continuous growth during warm weather, stands both severe drought and excessive rainfall, is not injured by close grazing, and during mild winters remains green and furnishes grazing the year around. Many farmers in the Black Prairie Belt are beginning to regard Dallis grass as the most valuable of all permanent grazing plants.

Johnson grass, the most important hay crop, is of relatively little value in permanent pastures, because when grazed through a season the rootstocks of the grass become weakened and the growth of stems and leaves is correspondingly lessened. Moreover, Johnson-grass pasture is generally considered greatly inferior in nutritive value to that of Bermuda or Dallis grass.

Carpet grass is best suited to the moist, sandy soils that occur to some extent around the borders of the Black Prairie Belt, and on such land usually makes more satisfactory grazing than does Bermuda grass. It stands close grazing and apparently is benefited by considerable trampling. Once a few patches of carpet grass are established it soon spreads over the entire field.

Broom sedge and other native grasses that come up in abandoned fields are of little value for grazing except in early spring, when they are young and tender. As the season advances they become tough and unpalatable, and will not even furnish a maintenance ration.

Lespedeza is probably the most valuable summer legume for permanent pastures on all soils except those exceptionally strong in lime.

It thrives on Trinity clay soils that are low in lime content and on all the nonlime soils that are reasonably fertile. It is a prolific seeder and spreads rapidly when once started in a pasture. Lespedeza furnishes grazing from May or June until frost in the fall, and will put more fat on livestock than any other grazing crop common in the section.

Sweet clover is a valuable summer legume to include in pastures on lime soils. It has been particularly valuable in converting Houston chalk from useless waste into productive grazing land. Of recent years, however, considerable difficulty has been encountered in securing a stand of sweet clover. Whether this is attributable to some disease or to some soil condition has not been determined. Applications of 200 to 300 pounds of acid phosphate or basic slag have enabled some farmers to secure a good stand after repeated failures on unfertilized land.

Black medic or yellow trefoil is a winter-growing legume that has been spreading rather rapidly over the Black Prairie Belt during recent years. As it is a very prolific producer of seeds, it spreads rapidly when once started. Black medic comes on in the fall and furnishes grazing from January or February to June. It is claimed to be particularly valuable for fattening early lambs. Black medic should be included in all permanent-pasture combinations.

Bur clover, another winter-growing legume, has habits of growth somewhat similar to black medic but has a shorter grazing period and is less valuable on the black-land soils. It thrives best on the red-clay soils of the nonlime group.

White clover makes its appearance in most permanent pastures that have been established for several years. It furnishes early-spring and late-fall grazing, and during mild winters may be grazed throughout the winter months.

Some of the best pastures—those composed of Bermuda grass, Dallis grass, Lespedeza, black medic, and white clover—will carry from two to three animal units[2] per acre for 10 months of the year. Few pastures in the Black Prairie Belt are utilized to their maximum grazing capacity and in general carry about one animal unit to 3.5 acres.

The first aim in pasture making should be toward developing year-long grazing. Such a pasture consists, in the main, of a combination of Bermuda grass, Dallis grass, Lespedeza, black medic, and possibly bur clover. Once these plants are established, white clover, hop clover, and other plants will come in and improve the grazing. In the older and better class of pastures now found in the Black Prairie Belt, most of these plants are found. There is frequently not a satisfactory mixture of all of these grasses distributed over the entire pasture, but usually Bermuda is more or less well set over most of the field, with here and there patches of Dallis grass and black medic, and Lespedeza is usually more or less well distributed.

The large amount of potential grazing land represented by idle fields varies all the way from recently cultivated fields scatteringly

[2] An "animal unit" is 1 horse, mule, or cow; or 2 yearlings; or 4 calves or colts; or 5 hogs; or 10 pigs; or 7 sheep or goats; or 14 lambs or kids.

set with Bermuda and practically free from bushes, to fields that have been out of cultivation for some time, that are well set with Bermuda and other grasses and legumes and more or less grown up with brush, briers, etc. The most economical way of converting these fields into good pastures depends largely upon the condition they are in. The well-sodded, brushy land may be merely fenced and grazed, and the bushes grubbed out and removed as time and opportunity permit. Such fields will furnish a large amount of good pasturage from the beginning and will improve with grazing. Making pasture from fields only partly set with Bermuda should be conducted along lines that make for permanency and ease of management in later years. (Fig. Nos. 6 and 9.)

MARKET MILK AND CREAM PRODUCTION

Dairying is one of the livestock enterprises to which the Black Prairie Belt is especially adapted. One great essential of successful

FIG. 6.—An excellent pasture in the making. This field, with scattering patches of Bermuda grass, is being converted into an excellent pasture by encouraging the spread of Bermuda and by the addition of Dallis grass, Lespedeza, and black medic. An occasional mowing will help keep down, and eventually will eliminate, the growth of weeds and bushes

dairying is dependable and cheap pastures. Pastures in this area can be depended upon from April to November and even throughout the whole year if they are not grazed too closely. Land upon which good pastures can readily be established can be purchased at $20 to $30 per acre. This is cheap pasture when it is considered that 1 acre will easily carry a cow during the season, and the better pastures will do more than this. (See pastures shown on cover page, and figs. 6 and 7.)

The market for milk produced in the black prairie is expanding rapidly. Condenseries, creameries, ice-cream companies, and whole-milk distributors to Florida cities have realized the milk-producing possibilities of this section and set up plants in or near it. The number of dairymen that can deliver their milk direct to the consumer is small, as Montgomery is the only large city in the section, but there is room for a great expansion in the other methods of distribution. The Florida winter population drew milk from as far as Wisconsin and Minnesota in the winter of 1925–26. The cost of transporting milk for this long distance is high. The winter

demands of Florida can readily be supplied from the black prairie at a cost for milk at the farm probably not greater than that in more northern sections and with a much lower transportation cost. Time is an important element in milk distribution, and this section has a great advantage in this respect. It takes about 21 hours to ship milk by express from Selma to Jacksonville, Fla., and 35 hours from Chicago.

Ice-cream manufacturing concerns and condenseries are expanding their operations in this section and offer a steady market the year round. Some concerns of nation-wide prominence have established plants in or near the Black Prairie Belt. There are several creameries in or near the black prairie, and they give a market for cream for those dairymen who can not market their milk in one of the ways mentioned. Butter can be easily shipped from the large butter-producing sections, so that a creamery can afford to pay little if any more than its competitor in the North. Milk or cream sold on a butterfat basis to be made into butter or ice cream usually does not bring as much to the producer as when sold for consumption as whole milk, but it is believed that in this section cream production is a profitable enterprise when carried on in connection with other enterprises, such as the production of cotton or Johnson grass hay.

The condition of the roads, especially in winter, is one of the things that limits the production of milk in this section. Milk usually has to be delivered at least once a day and at a certain hour of the day. Producers who sell whole milk need to be located on improved roads, as the dirt roads are often impassable in wet weather. This is a handicap to whole-milk producers, but it is not so serious with cream producers, who have much less bulk to haul and who deliver their product less frequently. The highways are rapidly being improved throughout the Black Prairie Belt, and this handicap of poor roads will be eliminated over much of the section in a relatively short time.

The winter feed problem is not difficult to solve in this belt. Only about 1¼ tons of dry roughage is necessary to carry an animal through the winter, and sometimes not as much as that is needed. Johnson grass hay is one of the cash crops here, and usually some hay of poor quality is left over, that may be fed. For the best results a legume, such as alfalfa, should also be provided. Alfalfa is not successful under all conditions but can be grown in some localities. Probably it would be desirable to set aside a small acreage best suited to alfalfa so that the dairy herd would be supplied with a good roughage during the time that pastures were not available. Where the production of alfalfa is impracticable, Lespedeza, cowpea, soy bean, or oat, vetch, and Canada pea hay may be used with good results. Any of these crops can be grown on land unsuited to alfalfa.

For commercial production it is desirable to keep up a maximum flow of milk, and to do this it is usually advisable to feed some concentrates during the pasture season. Cottonseed meal is generally used. Farmers in this section have the advantage of those farther north in the buying of cottonseed meal and are at a disadvantage in buying corn or other concentrates. Cottonseed meal should be fed with corn or oats to make a ration better balanced for milk production. Under favorable conditions this grain can be grown on land that is free from Johnson grass.

A few dairymen in the Black Prairie Belt are using silage. It is a very desirable feed when cows are not on pasture, as it gives succulence to an otherwise dry ration, but corn and cane silage should be balanced with a legume hay and a grain mixture containing cottonseed meal. Where a farmer has developed his pastures so that they can be used 10 or more months of the year and has plenty of nutritious hay, there is some doubt as to the advisability of having a silo. Where a silo is already on the farm, the question of filling it depends largely upon whether the cost of raising corn or sorghum and filling the silo will be more than offset by an increase in milk production. Where silage is used, the large varieties of sorghum appear to be more satisfactory than corn for this purpose.

A grain ration for cows on pasture may consist of a mixture of 300 pounds of corn-and-cob meal and 100 pounds of cottonseed meal. If desirable, ground oats may be substituted for part of the corn-and-cob-meal, using 2 bushels of oats for 1 of corn. While on good pasture the cows should receive from 1 to 4 pounds per head per day of this mixture, according to the amount of milk they are giving.

Where silage is fed, a satisfactory, daily ration for a cow that gives 20 pounds of milk, is 30 pounds of silage, 7 pounds of hay, and 6 pounds of grain feed; or, without silage, 15 pounds of hay and 6 pounds of grain feed. The grain feed in this ration may consist of 200 pounds of corn-and-cob meal (or the equivalent in corn-and-cob meal and oats) and 100 pounds of cottonseed meal.

These are simple rations that will utilize the home-grown feed produced in the cropping systems recommended for dairy farms.

The equipment necessary for a satisfactory dairy in the South is not as expensive as in the North. A barn with stanchions, cement floor, feed room, etc., and a detached milk house with a cooling tank and a sterilizer for the various milk utensils, is essential for the production of clean milk. With herds of 20 or more cows, the use of milking machines generally results in a saving of both time and labor where intelligent help is used, but where labor is cheap and reliable, hand milking may be more economical than machine milking. The proper cooling of milk is a serious problem during the summer months, especially where ice must be hauled a long distance. Cooling and other sanitary precautions are a large item of expense where a product such as grade A raw milk is produced and bottled on the farms. Where milk of a lower grade is produced these requirements are not as great. Probably the sanitary requirements for milk entering southern cities will become more strict as time goes on, and dairymen should realize that these requirements are in the interest of public health and should meet them in a spirit of public service. Sanitary practices really yield financial returns, for they prevent many losses through sour milk and low-grade dairy products which are sold at reduced prices.

In the matter of milk production most dairy herds of this section are noticeably weak. Dairying is a relatively new industry, and many of the present herds are made up of such cows as the owners have been able to pick up, and little or no attention has been given to individual milk production. It follows naturally, therefore, that a large percentage of the cows are low producers. Of the 38 herds from which records were secured not one had an annual average pro-

duction of 7,000 pounds of milk per cow. Four had an average production of over 6,000 pounds per cow, two had an average between 5,000 and 6,000 pounds, seven between 4,000 and 5,000 pounds, and the remainder below 4,000 pounds. The six herds having an annual average production of over 5,000 pounds per cow averaged 31 cows each, with an annual average production of 6,419 pounds of milk per cow. The average cost per 100 pounds of milk for this group was $1.97. The product from two of these six herds was retailed at fancy prices. The net return per cow for the four herds from which the product was sold wholesale was $106.77. The seven herds with an annual average production of 4,000 to 5,000 pounds per cow produced milk at a cost of $2.20 per 100 pounds. The net return per cow for this group, however, was only $30.

These figures clearly indicate the outstanding need of greater production per cow if dairying is to attain the position it should occupy in the Black Prairie Belt. Improvement of the herd by cutting out low producers, by the use of purebred bulls, and a study of feeds and feeding will enable many farmers to increase materially the production per cow. Low production in this section is to some extent offset by cheap pastures, a longer grazing season, relatively lower feed costs, and a much smaller investment in buildings and other equipment than is required in northern dairy sections. On the other hand, lack of experience on the part of many now engaged in dairying has a tendency to keep down production and increase the cost. This difficulty may be overcome by additional experience in dairy management and by close study of the details of the business.

Farm organizations, including milk production as the principal livestock enterprise, are shown on pages 25 to 30, inclusive.

BEEF-CATTLE PRODUCTION

From 1910 to 1920 considerable attention was given to beef-cattle production in some districts of the Black Prairie Belt, and the demand for good breeding stock resulted in the building up of a number of excellent herds of purebred beef animals. The sharp break in beef-cattle prices in 1921 destroyed the demand for breeding stock and resulted in the disposal of most of the purebred herds, usually at a considerable loss to the owners. With the future outlook for beef cattle again favorable, this enterprise once more offers considerable promise for this section, especially on the larger holdings where rather extensive acreages of grazing are available. Those who have stayed in beef-cattle production through its period of depression are now in position to reap some benefit from their faith in the recovery and ultimate success of the business.

The number of beef cattle on farms and ranges in the United States is now at the lowest point reached in many years. This fact, together with increased domestic consumption of beef and the upward swing of the price cycle, makes the future outlook for beef-cattle production particularly good.

There is a growing demand in the South for a better quality of beef than the ordinary beef animal in that part of the country. The featuring of "western beef" on restaurant menus is one indication

of this demand. The Black Prairie Belt can help to supply the demand for this class of cattle (fig. 7) as well as the demand for feeder cattle in the Corn Belt and other places.

At present, Montgomery, Ala., is the principal market and distributing point for beef cattle from the eastern portion of the Black Prairie Belt, and East St. Louis receives the bulk of the cattle shipments from Mississippi and western Alabama. The Union Stockyards of Montgomery serves as an auction market for all kinds of livestock. Buyers from various packing establishments are in attendance almost daily, and competitive buying tends to bring out the full market value for all animals offered. There is an increasing demand for quality beef animals and they usually command a decided premium.

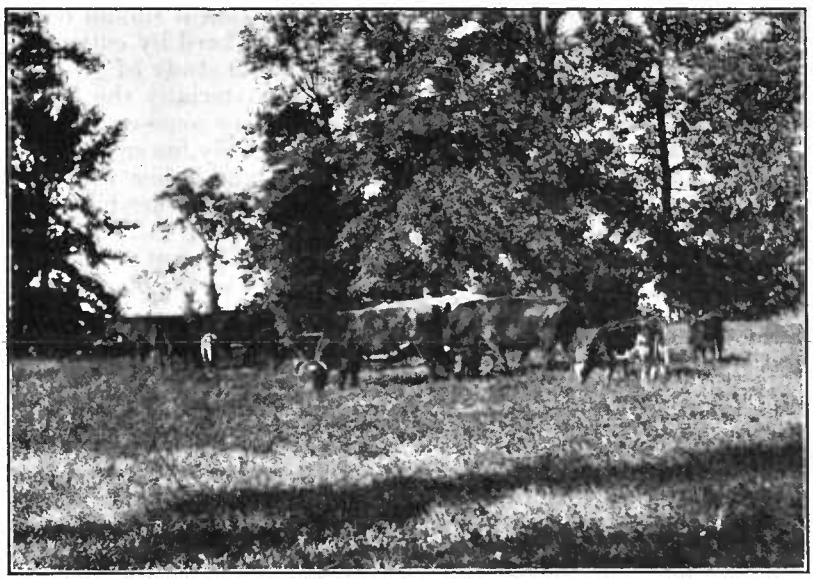

FIG. 7.—Good beef animals like these can be produced in the Black Prairie Belt and will materially aid in supplying the increasing demand for a better quality of beef in the South

A survey of beef-cattle production in the Black Prairie Belt shows that various methods of management are practiced. Some farmers are raising beef cattle on pasture alone, others supplement pasture with hay during the winter, and still others feed a small amount of concentrates in addition to hay in the winter. Some are doing a straight grazing business, buying up cattle in the spring, grazing them through the summer, and selling them off in the fall. Some are raising and feeding out their market animals; others combine with this method the practice of buying up stockers in the fall, wintering them on pasture, hay, and a little grain, and finishing them off on pasture the following season. Some are marketing their product as calves, whereas others sell only 2 to 3 year old heavy steers. Practically all now engaged in the beef-cattle business are improving their herds by using purebred bulls and by culling out the poorest cows and replacing them with the best heifers.

Good pastures are necessary for the economical production of beef cattle. A good pasture of Bermuda grass and Dallis grass in which there is a good stand of Lespedeza will produce good grass-finished beef without any supplementary concentrates. As a general thing, however, some cottonseed meal or cake or other concentrate along with the grazing is to be recommended. Aside from pasture, a supply of roughage is necessary for carrying the herd through the winter months in a satisfactory way. Off-grade hay may be utilized to good advantage for this purpose. Johnson grass hay is the usual winter forage. Where straight Johnson grass hay is used it should be supplemented with a small amount of protein concentrates, say about 1½ pounds of cottonseed meal per day for each cow. If the winter forage is a mixture of Johnson grass and some legume, such as alfalfa, sweet clover, soy beans, or Lespedeza, the feeding of such concentrates will be unnecessary. Where cattle are fed out, cottonseed meal is the concentrate generally used.

An abundant supply of clean water is another essential to successful cattle raising. There are but few dependable streams in this section, but in many localities an abundant supply of artesian water can be had from deep wells, many of which overflow in considerable volume.

Expensive shelters are not necessary for beef cattle in this section, but sheds of some sort are recommended as a protection from cold winter rains. Such sheds may be open on one side, and may be made of cheap material. When a dipping vat is available, dipping the cattle once or twice during the season will keep them free from external parasites.

Proper precautions should be taken to guard against parasites and diseases, and particularly against Texas fever ticks and Texas fever. All of the Cotton Belt States have some Texas fever ticks, but rapid progress is being made in tick eradication and large portions of several States are practically free of ticks. Tick eradication is largely responsible for the development of livestock farming in the Black Prairie Belt. The black belt counties of Alabama and Mississippi have been released from Federal quarantine for some time, but this does not mean that the section is entirely out of danger. There is still a threat of reinfestation from some of the surrounding territory that is still under quarantine. This condition calls for constant vigilance to protect herds of both dairy and beef cattle in the Black Prairie Belt. Copies of the regulations setting forth the conditions of quarantine and defining the quarantine territory may be obtained on application to the Secretary of Agriculture, Washington, D. C.

Returns from beef-cattle production vary widely and appear to be governed largely by the care and management given the herd. Herds showing greatest net returns are those to which roughage and a small amount of concentrates are fed during the winter and which have pasture ranging from 1 to 5 acres per adult animal. In some cases, where the year's business failed to show a profit, this was attributable to loss of breeding stock through failure to provide roughage for winter or to an excessive charge for pasture and feed. Frequently a large pasture is charged against a small herd of cattle when the same acreage would furnish grazing for three to four times as many animals; or off-grade hay is charged at top prices for a marketable

product. In most cases where the herd is well cared for and pasture and feed are charged at reasonable rates, the return from the enterprise is satisfactory. It should be remembered that much of the land on which beef cattle are grazed would bring in no return if not thus utilized and that a considerable quantity of the winter roughage used has no market value. Under these conditions even a small return from beef production is much better than letting the land lie idle.

The beef-cattle producer has several choices in so far as the marketing of his product is concerned. He may sell his stock as 6-to-7-month-old calves, or carry them over the second year and sell as long-yearling feeders, or carry them to maturity and market as grass-finished steers. Under favorable conditions it may be desirable to finish a number of the animals, or all of them. The general tendency is toward the younger ages, and the beef-cattle producer will do well to bear this in mind. The number of cattle that can be carried on the individual farm will depend upon the age at which they are marketed. More breeding animals can be carried where the offspring are disposed of as calves than where they are carried to maturity.

Suggested systems of farm organization with beef production as the principal livestock enterprise will be found on pages 31 to 33, inclusive.

EARLY-LAMB PRODUCTION

Sheep raising has never been considered an important enterprise in the Black Prairie Belt. According to the census figures, there were but 46,346 head of sheep in the black belt counties of Alabama and Mississippi in 1880. This was an average of but one head for each 50 acres of improved land or one head for every 100 acres of farm land. Since 1880, numbers have gradually decreased so that figures for 1920 show but one head to each 100 acres of improved land or one head to each 170 acres of farm land.

The steadily increasing demand for early lambs in cities within or adjacent to the Black Prairie Belt, and the fact that at present this demand is supplied chiefly from outside sources. indicates that there is little or no danger of too great an expansion of lamb production for some time to come. Production necessarily will be limited by the number of ewes procurable for breeding purposes, and as the available supply of these is more or less limited it is more than probable that local markets will demand all the lambs this section is capable of producing within the next several years. April and early May appear to be the best time for marketing lambs. This puts them on the market just ahead of the bulk of the shipments from the nearest competing sections (fig. 8). and at a time when prices are generally favorable. Most of the lambs from this section are marketed cooperatively, thus giving the small flock owner the same advantages that are enjoyed by the larger producers.

The present high level of sheep and lamb prices may not be maintained during the next few years, but it is not likely that the price of lambs will decline to a level where their production in this section would be unprofitable.

During the past few years a number of farmers, principally stockmen who have moved into this section from other States, have been

giving some attention to the production of early lambs as a minor enterprise in connection with dairying or beef-cattle production. Thus far the results secured from these efforts have been so satisfactory that a further expansion of this enterprise appears to offer considerable promise, especially on those farms where good pastures are available.

Returns from sheep raising are largely dependent upon the care and management of the flock. A survey of a number of farms taken at random in the Black Prairie Belt shows that gross annual returns from ewes vary from $4.35 to $12.83 per head and that the net return ranges from $1 to $7.50 per ewe. This spread in amount of return just about represents the difference in efficiency of management.

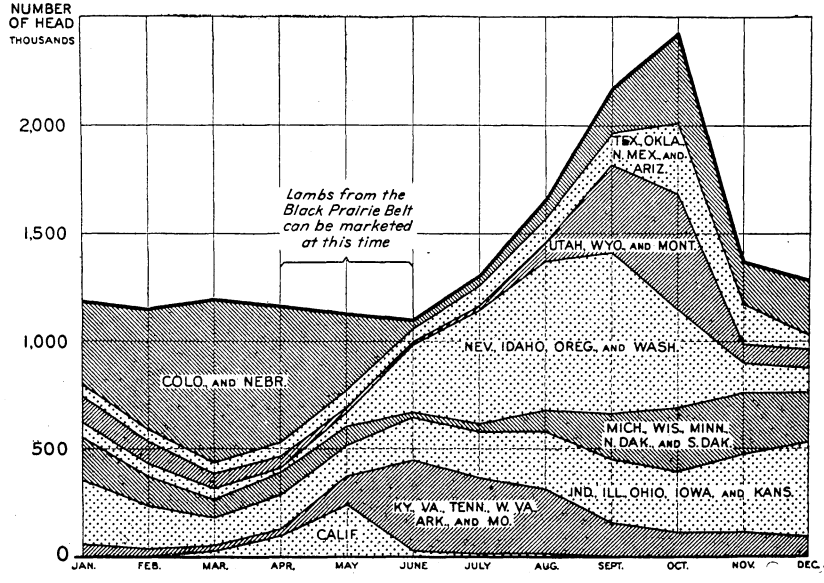

FIG. 8.—Lambs from the Black Prairie Belt can be put on the market in April and early May, ahead of those from sections that compete in spring-lamb production, as shown on the chart, which gives the origin of sheep and lamb receipts for 1925

The gross returns per ewe from lambs alone ranged from $4.18 to $9.90, the average being $6.27. The average weight of lambs sold was 78.9 pounds, the average net price received being $9.80 per hundredweight. The wool clip per animal ranged from 4 to 7 pounds, with an average of 5.7 pounds per animal. This is considerably above the State average of 3.23 pounds per fleece, as given by the Division of Crop and Livestock Estimates, United States Department of Agriculture, for Alabama and Mississippi, the heavier fleece resulting from improvement of the native stock by the use of purebred rams.

The average value of ewes on these farms was given as $7 per head; hence an average gross return of $6.27 per ewe for lambs gives some indication of the possibilities of this section for the profitable production of early lambs. Most of the farmers claim that the wool clip will pay all out-of-pocket expenses, leaving returns from the sale of lambs as profit.

From this study it is not possible to say how many sheep can be successfully carried on a given-sized farm, as there are few if any large flocks in the section. The danger of parasites increases tremendously when sheep in large numbers are confined on closely grazed areas. Probably it is possible to handle sheep successfully in this manner where the farmer is very careful, but it would seem safer to use sheep as a livestock enterprise secondary to dairy or beef-cattle production until their success in large flocks has been demonstrated. The suggested farm organizations on pages 27 to 33, inclusive, include sheep as a side line rather than as the principal livestock enterprise.

The cheapest and best feed for sheep is good pasture, and on many farms of this section good grazing is available for the entire year. (Fig. 9.) A rolling upland pasture of Bermuda and Dallis grass, mixed with Lespedeza, or black medic, sweet clover, bur clover, or

FIG. 9.—Where good pasture is available sheep raising can be made a profitable enterprise on Black Prairie Belt farms, and a well-managed flock will bring a good return from the sale of early lambs

white clover makes ideal grazing for sheep. Black medic is especially valuable in a sheep pasture, as it furnishes excellent grazing during the winter and spring months. Young oats make splendid grazing for ewes and lambs, and the oat fields may be grazed to advantage in winter and early spring when the soil is not too soft or muddy. Lowland pastures are not desirable for as a rule sheep do not thrive on land that is wet or swampy.

Much less feeding is required in the Black Prairie Belt than in sections farther north. Some farmers are raising their sheep on pasture alone, using no hay or grain feed at any time of the year. Others feed some hay in the winter but no grain. Some feed a small amount of grain but no hay; others feed both hay and a small amount of grain in winter. Best returns seem to result from feeding some legume hay in the winter, and a small amount of grain while the lambs are running with the ewes. As a rule, the hay fed is off-grade on account of weather damage. It was found in this survey that the farmer who secured best returns from his

flock fed 4 tons of soy-bean hay and 3 tons of a mixture of wheat bran, corn meal, and cottonseed meal to 100 ewes, 115 lambs, and 4 rams. On the farms studied, lambs finished on pasture alone weighed from 70 to 75 pounds at 4 to 5 months of age; where ewes and lambs were fed some legume hay the lambs averaged 80 pounds; and the farmer who fed soy-bean hay and grain produced lambs averaging 93 pounds.

Expensive buildings are unnecessary for sheep raising in this section, as there are few days when the flock can not be on pasture, but they should be provided with sheds of some sort for protection against the cold winter rains. Lots for penning the flock at night are desirable. These should be provided with "dog-proof" fences, as roving curs are one of the worst menaces to sheep raising in this section.

Pastures should be fenced, preferably with 30 to 36 inch woven wire next to the ground, with two or three strands of barbed wire on top. As sheep thrive best when their grazing ground is changed frequently, the pastures should be divided with cross fences into several separate fields so that the flock may be changed from one pasture to another at intervals during the year.

Most of the wool is pooled and marketed cooperatively. The average price of 38.4 cents a pound that was received by farmers in this section for their 1925 clip compares favorably with prices in larger producing areas.

The attractive returns that have been realized by a few farmers will doubtless encourage many others to go into the production of early lambs. Some may wish to engage in the industry on a large scale, thinking that if a small flock is profitable a large one will bring in proportionate returns. This may or may not be true, for no information is available to show relation of size of flock to net returns. The inexperienced sheepman will be wise to start in a small way, and pursue a safe policy. Sheep raising may be conducted with a relatively small amount of labor and expense, but it is also true that there are many risks to be encountered, and those not familiar with the industry should increase the size of their business only as accumulated knowledge and experience appear to justify such expansion. The inexperienced farmer who plunges blindly into sheep raising is almost certain to meet with disappointment, and to lose both time and money. The same fate is likely to meet the farmer who gives little or no personal attention to his farming business, leaving everything to tenants.

The purchase of high-priced breeding stock by those starting in sheep raising is not to be recommended. Good, healthy native ewes seem to make the best foundation stock to begin with. These ewes are hardy, are acclimated, and usually are prolific and good mothers. Bred to a good mutton-type ram, they will produce lambs that will weigh from 60 to 80 pounds at from 3 to 5 months of age. Lambs dropped from January to March can be marketed from April to July, when prices are usually satisfactory.

An effort should be made to have all the lambs dropped as near the same time as possible. This will enable the grower to market a much more even grade of product. Best results seem to be secured from lambs dropped during the period from late December to the

1st of February. To have lambs dropped at this time the ewes should be bred between August 1 and October 1, as ewes carry their young approximately 145 days.

HOG PRODUCTION

Farms in the Black Prairie Belt as a rule are not well adapted to commercial hog production as an important part of the farm business because usually not enough corn, peanuts, or other fattening crops can be economically grown to fatten many hogs. The corn that is raised can usually be used to better advantage if fed to other classes of livestock. Probably every farm should raise its own meat supply, and possibly there are farms where a large quantity of corn can be raised economically and a part or all of it fed to hogs. Then there may be farms that have a considerable acreage of sandy land suitable for peanuts, on which hogs can be fattened profitably. On typical Black Prairie Belt farms, however, other classes of livestock that utilize hay and pasture to better advantage than hogs have a much more important place.

POULTRY PRODUCTION

Farms in this belt should raise enough poultry to meet the household needs. Some farmers can go much further than this if they have a natural aptitude for the business and a market for their product. Commercial poultry production is not confined to any one part of the country and can be carried on here, as far as transportation and markets are available. The raising of turkeys has become of considerable importance in this section recently. It appears to be generally adaptable to the section, as turkeys do well where there are large tracts for them to range over. Except on commercial poultry farms, chickens and turkeys probably can not occupy more than a minor place in the organization of the farms.

SUGGESTED SYSTEMS OF FARMING FOR THE BLACK PRAIRIE BELT

The wide range in the size of farms and the extreme variation in the extent of pasture and hay land per farm make it impossible to outline organization and cropping systems to fit all farms. Since both Bermuda and Johnson grass are very difficult to eradicate, it is generally advisable to retain Bermuda pastures and Johnson-grass meadows as permanent enterprises and not to attempt to include either in a rotation with intertilled crops. All intertilled crops should be grown on land relatively free from Bermuda and Johnson grass, and for this reason a practicable cropping system will depend largely upon the acreage of such land that is available on the individual farm. On farms where there is an excess of pasture it may be advisable to rent additional land on which to grow feed crops, and, conversely, on farms that have little or no grazing land it will be necessary to lease additional pasture if livestock production is to be the principal enterprise.

The suggested farm organizations and cropping systems have been worked out by combining the desirable features of a number of the most successful farms of the section. These outlines are intended for those farms on which there is enough pasture and hay land to justify the introduction of some phase of livestock production. They

are not expected to fit all such farms, but are offered as guides, and should be considered as subject to such changes as are necessary to meet conditions on each farm.

SYSTEMS WITH DAIRYING AS THE PRINCIPAL ENTERPRISE

The cropping systems have been planned with a view to producing a maximum supply of feed crops, and at the same time maintaining or increasing soil fertility by growing a leguminous crop on the land at least once in every three years, and in many cases once every two years. The principal leguminous crop in the rotation is grown as a second crop after oats. This crop may be cowpeas, soy beans, Lespedeza, or sweet clover, depending upon the nature of the soil and other conditions. Where cowpeas or soy beans are used, the land needs to be plowed or disked after the oats are harvested, and if dry weather prevails at this time difficulty in securing a stand may result. Lespedeza and sweet clover both have the advantage of requiring no special preparation of the land for seeding, for Lespedeza is seeded on the oats in February or March, and sweet clover is seeded at the same time the oats are sown in the fall. Cowpeas sown in the corn at the last cultivation, or soy beans planted in the corn rows, aid materially in increasing soil fertility and furnish valuable grazing for the livestock after the corn crop has been harvested. Soy beans, planted with corn or cane grown for silage, add both to volume and to feeding value of the product.

The estimated crop yields, although generally larger than the average for all farms of the section, are not out of line with those normally produced on some of the better farms, nor are they in excess of what may reasonably be expected from farms on which dairying is the principal enterprise and where full use is made of the manure produced. On farms where it is not possible to produce such yields, adjustments in crop acreages or in size of the livestock enterprise may be made to fit the conditions. It will be noted that the estimated yields are slightly smaller for the larger-sized farms. This is because there is usually a greater percentage of low-producing land on the larger farms. The adoption of the suggested crop rotations and a proper utilization of the manure produced by the livestock will do much to increase the productivity of the poorer soils. In general it is assumed that the cultivated crops will be grown on fertile, productive land, and that the Johnson grass meadows will be kept in a state of maximum productivity by proper management.

In the estimates for feed requirements of livestock it is assumed that the work animals will consume the equivalent of 40 bushels of corn and 20 bushels of oats per head annually.

It is estimated that the milk cows will be on pasture for eight to nine months of the year and during seven to eight months of this time will receive no roughage. If giving a full flow of milk while on pasture, they should be given some grain feed, but if they have been bred to freshen in the fall but little grain need be fed during the midsummer pasture season. For the time the cows are on dry roughage, or dry roughage and silage, and during the time they are giving a full flow of milk they should receive a maximum grain ration. In determining the grain requirements for the dairy herds it is assumed that a cow producing 6,000 pounds of milk a year will receive 6

pounds of grain feed per day for 6 months and 1 pound per day for 140 days.

Early lamb production is included in the organization plans of all but the smaller dairy farms. The amount of grain required to carry a ewe and fatten her lamb is estimated at 60 pounds per year. The majority of lamb producers in this section feed no grain, but the greatest net returns have been secured by feeding the above quantity of equal parts of corn meal, cottonseed meal, and wheat bran. When the pastures contain winter legumes, however, and remain green through the winter, the grain ration may be materially reduced and sometimes entirely omitted.

On most dairy farms a home supply of pork may be produced to advantage. The estimated amount of corn required to carry one brood sow and grow eight pigs to 200 pounds is 150 bushels. This quantity may be considerably reduced if cowpeas, soy beans, or peanuts are planted in the corn and grazed off by the hogs after the corn is harvested.

In these plans it is assumed that the pastures are well developed, that they have a carrying capacity comparable with the better pastures now existing or capable of being developed in the area, and that an ample supply of legume hay will be produced to meet the feed requirements of the dairy herd. It is also assumed that the dairy herds will be made up of high-producing cows in so far as it is practicable to procure them, and that proper attention will be given to breeding in order that the future production of the herd may be increased. The milk production per cow of the herds as given in the standard organizations is 6,500 pounds for 25 to 40 cow herds, 6,000 pounds for 60-cow herds, and 5,500 pounds for 100-cow herds. These figures are considerably above the average production of cows in this area. They are not above the average for some of the better herds, however, nor are they above what may be reasonably expected to result from building up the existing herds by selection, use of good bulls, proper feeding, etc., and without the introduction of large numbers of high-priced animals.

The amount of labor required depends largely upon the efficiency of the available supply. On dairy farms a supply of reliable, year-around help is essential to the efficient conduct of the business. As a rule, colored labor does not like dairy work, and for this reason the securing of steady help is sometimes a vexing problem. Often the regular dairy help can be held by providing a small acreage of cotton to give employment to the women and children. The use of milking machines, where the herd is large enough to justify the investment, greatly reduces the amount of dairy help required. On dairy farms where the production of market hay is important it is usually necessary to employ extra day labor during the haying season. Some farmers have adopted the plan of letting their hay out to be cut on shares. This practice reduces the cash expenses and seems to work out satisfactorily when properly supervised.

In estimating the amount of labor required in each of the following organization plans it is assumed that the Johnson-grass meadows will be mowed at least three times each season.

No allowance is made for raising calves other than those required for replacement. As a rule it is poor economy to raise anything but the highest quality of heifer calves; hence it is assumed that all

bull calves and all heifer calves not needed for replacement will be killed or otherwise disposed of at time of birth.

The following organization plans are for dairy farms of four sizes, ranging from 100 acres with 25 cows, to 1,200 acres with 100 cows:

A 100-ACRE DAIRY FARM WITH 25 COWS

TABLE 1.—*Dairy farm No. 1: Organization plan for farm of 100 acres with 25 cows*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	100			
Buildings, roads, waste, etc	8			
Permanent pasture	40			
Corn for grain	20	Bushel	30	600
Oats for grain	10	do	30	300
Cowpea, soy-bean, Lespedeza, or sweet-clover hay sown after oats.	10	Ton	1	10
Hay—Johnson grass, alfalfa, or mixed	20	do	3	60
Garden and truck crops (home use)	2			
	Total number			
Livestock:				
Work animals	4			
Milk cows	25	Pounds milk		162,500
Heifers, 2 years old	6			
Heifers, 1 year old	6			
Bull	1			
Brood sow (home use)	1	Pigs		8
Hens (home use)	50			

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cottonseed meal [1]
	Tons	*Bushels*	*Bushels*	*Tons*
4 work animals	6	160	80	
25 milk cows	30	244	206	5.7
12 heifers [2] and 1 bull	10			
1 sow and 8 pigs		150		
Total	46	554	286	5.7

Labor required: Operator and two hands.
Products for sale: [3] 162,500 pounds milk, 5 old cows, and 20 tons hay.

[1] Six tons of cottonseed meal bought.
[2] Six 2-year-old heifers and six 1-year-old heifers.
[3] Estimates of the quantity of products for sale are given in round numbers and do not always check with the difference between the total production and the amount consumed on the farm. This applies to all tables that follow.

ORGANIZATION OF FARM NO. 1

This dairy farm illustrates the type of small farm on which dairy products are the only source of income, except when there is a surplus of hay for sale. This farm could be operated by the farmer and his family with little, if any, outside help. It is what may be called a "family-size" farm. The important conditions that might determine a farmer in setting up an organization similar to this one are as follows.

(1) Inclination and ability to put in the long days of work every day in the year. This is necesary to success in dairying.

(2) Capital to own and equip a farm of 100 acres. Usually less than a 50 per cent equity in the entire business would not be desirable.

(3) A milk shipping station or milk route to such station or other market within easy reach of the farm.

(4) A farm on a road passable every day in the year and not too far from the place where the farmer would have to deliver his milk.

(5) A farm capable of having about 40 acres of good pasture, 30 to 40 acres of productive crop land relatively free from Bermuda and Johnson grass, 5 to 10 acres in productive Johnson grass meadow, and 5 to 10 acres of alfalfa or other legume meadow.

(6) Family labor to do most of the milking. This would be a decided advantage on this type of farm.

On this farm the 30 acres of crop land is to be divided into three 10-acre tracts to be devoted to a three-year rotation of corn, oats, and a leguminous crop. This rotation will be as follows: First year—oats for grain, followed by a leguminous crop for hay; second year—corn for grain; third year—corn for grain with oats sown in the fall. Under this system 20 acres will be in corn each year; 10 acres following the legume hay crop of the previous year, and 10 acres on which corn was grown the preceeding year. Cowpeas or soy beans should be planted in the corn each year to keep up soil fertility and provide extra grazing after the corn is harvested, and the land on which corn follows corn should be given a heavy application of manure from the dairy animals. The use of some commercial fertilizer on the corn may also aid in producing satisfactory yields. One-third to one-half of the Johnson grass should be plowed up each fall and sown to oats and vetch or Canada peas. This practice will not only provide a crop of valuable hay for the milk cows, but will also serve to keep the Johnson grass at estimated maximum production.

This system is capable of some adjustment to meet varying conditions. Sorghum-cane silage may be used to replace part of the hay, in which case the crop acreage could be arranged something like this:

	Acres
Corn for grain	17
Sorghum cane for silage	3
Oats for grain	15
Legumes for hay (after oats)	15
Johnson grass or alfalfa hay	15

The 3 acres of sorghum cane well fertilized should produce about 45 tons of silage and replace about 15 tons, or 5 or 6 acres, of hay. If a larger acreage of crop land is available, a small acreage of cotton can be added to the organization. If more land is in Johnson grass, the hay enterprise could form a larger part in the organization.

The average production per cow has been put at 6,500 pounds of milk. This is much higher than that of most herds in the section. Low production is perhaps the outstanding fault of dairy herds in the South, but there is no good reason why the yearly production of a herd should not be brought up to this figure, or better. This is an important factor in the production of milk at a low cost.

The estimate of quantity of milk for sale is given in round numbers, and no deduction is made for milk used by the family. With a herd of 25 cows, producing around 6,500 pounds of milk each, the

quantity that would be consumed by the average family would probably not exceed 3 or 4 per cent of the total production; with herds of 50 or more cows the amount used by the family would be practically negligible as compared with the total production.

A 400-ACRE DAIRY, SHEEP, AND HAY FARM

TABLE 2.—*Farm No. 2: Organization plan for a 400-acre dairy, sheep, and hay farm*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	400			
Buildings, roads, waste, etc	10			
Permanent pasture	160			
Corn	50	Bushel	30	1,500
Oats for grain	25	do	30	750
Cowpea, soy-bean, Lespedeza, or sweet-clover hay—after oats.	25	Ton	1	25
Hay—Johnson grass, alfalfa, or mixed	150	do	2½	375
Garden and truck crops (home use)	5			
	Total number			
Livestock:				
Work animals	10			
Milk cows	40	Pounds milk		260,000
Heifers, 2 years old	10			
Heifers, 1 year old	10			
Bull	2			
Ewes	100	Lambs		90
Rams	3	Pounds wool		550
Brood sows (home use)	3	Pigs		24
Hens (home use)	60			

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cottonseed meal [1]
	Tons	*Bushels*	*Bushels*	*Tons*
10 work animals	15	400	200	
40 milk cows	50	390	330	9.1
20 heifers [2] and 2 bulls	20			
100 ewes, 90 lambs, and 3 rams	3	35		1.0
3 brood sows and 24 pigs		450		
Total [3]	88	1,275	530	10.1

Labor required: Operator and seven hands.
Products for sale: 260,000 pounds milk, 8 old cows, 90 lambs, 550 pounds wool, 310 tons hay, 225 bushels corn, and 220 bushels oats.

[1] Cottonseed meal purchased.
[2] Ten 2-year-old and ten 1-year-old heifers.
[3] One ton wheat bran for sheep not given in table.

ORGANIZATION OF FARM NO. 2

This organization plan differs from the preceding in size of business, and in the inclusion of winter-lamb production and market hay as a cash crop, in addition to the dairy enterprise. On farms of this size a flock of 100 ewes may be carried with but little additional cost for labor, feed, or equipment. The cropping system is practically the same as for farm No. 1, with corn, oats, and a legume hay crop grown in a three-year rotation. The same adjustments in crop acreage, etc., as for farm No. 1, on a larger scale, are available for the operation of this farm.

The conditions under which an organization of this kind could be built up are not materially different from those in farm No. 1, except in such items as the acreages of crops. This is a larger business than the family of usual size could handle. A milking machine would be economical on this farm if it had intelligent care, unless labor is cheap and dependable.

In some localities it may be possible to rent mules during the rush season. Where this is the case it will not be necessary to carry the number of work animals given in this organization scheme.

No allowance is made in this organization plan for the replacement of breeding ewes with lambs raised. It is assumed that under present conditions such replacement can be most economically effected by the purchase of native ewes from southern Alabama and Mississippi, and from western Florida. This applies to all organization plans that follow.

AN 800-ACRE DAIRY, SHEEP, HAY, AND COTTON FARM

TABLE 3.—*Farm No. 3: Organization plan for a 800-acre dairy, sheep, hay, and cotton farm*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	800			
Buildings, roads, waste, etc.	30			
Permanent pasture	250			
Cotton	70	Pounds lint	200	[1] 28
		Pounds seed	400	[2] 14
Corn	70	Bushel	25	1,750
Oats	70	do	25	1,750
Cowpea, soy-bean, Lespedeza, or sweet-clover hay after oats.	70	Ton	1	70
Hay—Johnson grass, alfalfa, or mixed	300	do	2½	750
Garden and truck crops (home use)	10			
	Total number			
Livestock:				
Work animals	16			
Milk cows	60	Pounds milk		360,000
Heifers, 2 years old	15			
Heifers, 1 year old	15			
Bulls	3			
Ewes	100	Lambs		90
Rams	3	Pounds wool		550
Brood sows (home use)	3	Pigs		24
Hens (home use)	60			

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cottonseed meal [3]
	Tons	*Bushels*	*Bushels*	*Tons*
16 work animals	24	640	320	
60 milk cows	75	510	420	11.5
30 heifers [4] and 3 bulls	30			
100 ewes, 90 lambs, and 3 rams	3	35		1.0
3 brood sows and 24 pigs		450		
Total [5]	132	1,635	740	12.5

Labor required: Operator and 11 hands.

Products for sale: 360,000 pounds milk, 12 old cows, 90 lambs, 550 pounds wool, 28 bales cotton, 680 tons hay, 1,000 bushels oats.

[1] Bales.
[2] Tons.
[3] Cottonseed meal secured in exchange for cottonseed.
[4] Fifteen 2-year-old and fifteen 1-year-old heifers.
[5] One ton wheat bran for sheep not given in table.

ORGANIZATION OF FARM NO. 3

The organization is similar to No. 2, except that the farm is larger and cotton is included in the crops as an important enterprise. The crop rotation will be as follows: First year—cotton; second year—corn; third year—oats, followed by a legume for hay. Under certain conditions it may be desirable to reverse the cotton and corn, that is, have the rotation as follows: corn the first year, cotton the second year, and oats and a leguminous hay crop the third year. The considerations and alterations named under farms 1 and 2 also apply to No. 3. The labor problem will be one of the principal factors in the success of this type of farm. A milking machine and a tractor could be used to advantage on this farm if they were given intelligent care. The tractor can be used in breaking the land, and in mowing, baling, hauling hay, etc., and will reduce the number of mules required to operate the farm. The cotton crop and perhaps some of the other crops could be handled by croppers, thus giving a more dependable supply of labor for the dairy and hay fields. A dairy is difficult to operate efficiently where some of the help is liable to be absent at any time, as is true where negro day or month hands are used.

A 1,200-ACRE DAIRY, SHEEP, HAY, AND COTTON FARM

TABLE 4.—*Farm No. 4: Organization plan for a 1,200-acre dairy, sheep, hay, and cotton farm*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	1,200			
Buildings, roads, waste, etc	70			
Permanent pasture	410			
Cotton	125	Pounds lint	200	[1] 50
		Pounds seed	400	[2] 25
Corn	125	Bushel	25	3,125
Oats	125	do	25	3,125
Cowpea, soy-bean, Lespedeza, or sweet-clover hay—after oats.	125	Ton	1	125
Hay—Johnson grass, alfalfa, or mixed	330	do	2½	825
Garden and truck crops (home use)	15			
	Total number			
Livestock:				
Work animals	24			
Milk cows	100	Pounds milk		550,000
Heifers, 2 years old	25			
Heifers, 1 year old	25			
Bulls	4			
Ewes	130	Lambs		120
Rams	4	Pounds wool		680
Brood sows (home use)	4	Pigs		32
Boar	1			
Hens	100			

[1] Bales. [2] Tons.

TABLE 4.—*Farm No. 4: Organization plan for a 1,200-acre dairy, sheep, hay, and cotton farm*—Continued

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cottonseed meal [3]
	Tons	*Bushels*	*Bushels*	*Tons*
24 work animals	36	960	480	
100 milk cows	125	850	700	19.25
50 heifers [4] and 4 bulls	50			
130 ewes, 120 lambs, and 4 rams	4	48		1.33
4 brood sows, 32 pigs, and 1 boar		600		
Total [5]	215	2,458	1,180	20.58

Labor required: Operator and 17 hands.
Products for sale: 550,000 pounds milk, 20 old cows, 120 lambs, 680 pounds wool, 50 bales cotton, 735 tons hay, 650 bushels corn, and 1,900 bushels oats.

[3] Cottonseed meal secured in exchange for cottonseed.
[4] Twenty-five 2-year-old and twenty-five 1-year old heifers.
[5] One and one-third tons wheat bran for sheep not given in table.

ORGANIZATION OF FARM NO. 4

The organization plan for farm No. 4 is similar to that for farm No. 3, except that all enterprises save hay production are on a considerably larger scale. The cropping system is the same as for the two preceding farms: Cotton, corn, oats, and a leguminous hay crop are grown in a three-year rotation, but yields of corn and oats are estimated as being slightly lower. The main difference in the two sets of plans, however, is in the size of business. What was said regarding the general system of management, the rearrangement of crops where silage is used, and the advisability of using equipment like milking machines and tractors, in connection with farm No. 3, applies to farms of this size.

SYSTEMS WITH BEEF CATTLE AS THE PRINCIPAL ENTERPRISE

Since an abundance of pasture is the first requisite for successful beef-cattle production the following organization plans are intended to apply mainly to comparatively large holdings on which 50 to 60 per cent of the total land is in pasture, from 12 to 15 per cent is suitable for the production of intertilled crops, and the remainder is in Johnson-grass meadow. On farms that have a greater or smaller percentage of land in pasture the organization may be adjusted to suit the conditions.

Extensive acreages of rough land that are located far from market can be utilized for beef-cattle production to advantage, as good roads or nearness to a market or shipping point is not as essential for a beef farm as for a dairy farm.

The plans outlined are based on the assumption that the cattle will be marketed as calves or yearling feeders and that the pastures will carry the equivalent of one adult animal to each 3 acres. Many pastures will do better than this, and where this is the case the number of breedings animals may be increased.

The production of early lambs is included in these plans as a minor livestock enterprise, with market hay and cotton as cash crops. The general cropping system is practically the same as outlined for dairy farms and has been planned with the view of meeting the feed requirements of the farm as nearly as possible. Cotton production is included for those farms on which there is more good crop land than is needed for the production of the feed required. An additional reason for including cotton is that on many livestock farms a small acreage of this crop is advantageous in that it gives employment to the families of the farm laborers.

A 600-ACRE BEEF CATTLE, SHEEP, HAY, AND COTTON FARM

TABLE 5.—*Farm No. 5: Organization plan for a 600-acre beef cattle, sheep, hay, and cotton farm*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	600			
Buildings, roads, waste, etc	25			
Permanent pasture	350			
Cotton	30	Pounds lint	200	[1] 12
		Pounds seed	400	[2] 6
Corn	30	Bushel	25	750
Oats	30	do	30	900
Cowpea, soy-bean, sweet-clover, or Lespedeza hay after oats.	30	Ton	1	30
Hay—Johnson grass, alfalfa, or mixed	130	do	2½	325
Garden and truck crops (home use)	5			
	Total number			
Livestock:				
Work animals	8			
Beef cows	80	Calves or yearlings		54
Heifers, 2 years old	10			
Heifers, 1 year old	10			
Bulls	3			
Ewes	100	Lambs		90
Rams	3	Pounds, wool		550
Brood sows (home use)	2	Pigs		16
Hens (home use)	75			

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cottonseed meal [3]
	Tons	*Bushels*	*Bushels*	*Tons*
8 work animals	12	320	160	
80 beef cows	80			7.2
20 heifers [4]	16			1.4
3 bulls	4	30		.5
100 ewes, 90 lambs, and 3 rams	3	35		1.0
2 brood sows and 16 pigs		300		
Total [5]	[6] 115	685	160	10.1

Labor required: Operator and five hands.

Products for sale: 54 calves or 54 yearling feeders, 8 old cows, 90 lambs, 550 pounds wool, 12 bales cotton, 180 to 240 tons hay, and 740 bushels oats.

[1] Bales.
[2] Tons.
[3] Six tons of cottonseed meal to be secured in exchange for cottonseed and 4.1 tons purchased.
[4] Ten 2-year-old and ten 1-year-old heifers.
[5] One ton wheat bran for sheep not given in table.
[6] If yearling feeders are sold an additional 40 to 60 tons of hay will be required.

ORGANIZATION OF FARM NO. 5

Organization No. 5 is for a beef-cattle farm of about 600 acres that has about 90 acres in good, clean crop land for growing cotton, corn, oats, and cowpeas, soy beans, sweet clover or Lespedeza, and about 130 acres of Johnson grass, alfalfa, or mixed-hay land as a permanent enterprise. Besides beef cattle, the production of early lambs is a minor livestock enterprise, and hay is a cash crop. The crop land will be devoted to a three-year rotation as follows: First year, cotton; second year, corn; third year, oats for grain, followed by a leguminous crop for hay. Under this plan all feed except cottonseed meal and wheat bran will be produced on the farm. The cottonseed produced on the farm can be traded for meal.

The farm income will be from 6- to 7-month-old calves or yearling feeders, lambs, wool, and market hay. Market demands and the viewpoint of the individual farmer will determine whether the cattle are to be disposed of as calves or as long yearlings. If more good corn land were available a part of the cattle could be fattened on corn. Several choices are thus available as to the kind of cattle sold. This gives the farmer an opportunity to take advantage of temporary market conditions.

Another possibility that the operator of this type of farm and the succeeding types of beef farms may turn to is the grazing of cattle from southern Mississippi or Alabama, purchased as thin cattle in the spring and sold in the fall. This practice may be used where pasture is abundant but when there is not enough feed to winter all the stock that may be grazed.

The same general suggestions relative to growing cotton and other crops with cropper labor, the use of a tractor, and the renting of mules during the rush season, as given for the larger-sized dairy farms, apply to this and the succeeding beef-cattle farm.

A 1,200-ACRE BEEF CATTLE, SHEEP, HAY, AND COTTON FARM

TABLE 6.—*Farm No. 6: Organization plan for a 1,200-acre beef cattle, sheep, and hay farm*

Item		Production		
		Unit	Per acre	Total
	Acres			
Land	1,200			
Buildings, roads, waste, etc	75			
Permanent pasture	700			
Cotton	60	Pounds lint	200	[1] 24
		Pounds seed	400	[2] 12
Corn	60	Bushel	25	1,500
Oats	60	do	25	1,500
Cowpea, soy-bean, sweet-clover or Lespedeza hay after oats.	60	Ton	1	60
Hay—Johnson grass, alfalfa, or mixed	240	do	2½	600
Garden and truck crops (home use)	5			
	Total number			
Livestock:				
Work animals	16			
Beef cows	150	Calves or yearlings		100
Heifers, 2 years old	20			
Heifers, 1 year old	20			
Bulls	6			
Ewes	150	Lambs		130
Rams	5	Pounds wool		925
Brood sows (home use)	4	Pigs		32
Boar	1			
Hens (home use)	100			

Animal groups	Feed requirements for livestock			
	Hay	Corn	Oats	Cotton-seed meal [2]
	Tons	*Bushels*	*Bushels*	*Tons*
16 work animals	24	640	320	
150 beef cows	150			13.5
40 heifers [4]	32			3.0
6 bulls	8	60		1.0
150 ewes, 130 lambs, and 4 rams	5	55		1.5
4 brood sows and 32 pigs		600		
Total [5]	[6] 219	1,355	320	19.0

Labor required: Operator and 10 hands.
Products for sale: 100 calves or 100 yearling feeders, 16 old cows, 130 lambs, 925 pounds of wool, 24 bales of cotton, 270 to 380 tons of hay, and 1,180 bushels of oats.

[1] Bales
[2] Tons.
[3] Cottonseed meal secured in exchange for cottonseed.
[4] Twenty 2-year-old and twenty 1-year-old heifers.
[5] One and one-half tons wheat bran for sheep not given in table.
[6] If yearling feeders are sold an additional 70 to 110 tons of hay will be required.

ORGANIZATION OF FARM NO. 6

The organization plan for a 1,200-acre beef cattle, sheep, and hay farm differs from the preceding plan chiefly in the size of business. The acreage in cultivated crops is doubled, hay production is increased over 80 per cent, the cattle enterprise increased 87 per cent, and sheep 50 per cent. The cropping system is the same as for farm No. 6; cotton, corn, and oats with a leguminous hay crop following the oats, are grown in a three-year rotation. The general management and sources of income will be the same as for the preceding farm.

CONCLUSION

Cotton production has become so hazardous an undertaking in many parts of the Black Prairie Belt that livestock farming now appears to offer the best means of properly utilizing the natural resources of these sections. A radical shift from cotton to livestock is not recommended, however, for cotton production should continue to occupy an important place in the organization of many prairie belt farms. But the extensive acreages of land that are either partly or well sodded in Bermuda or Johnson grass can be more economically used for grazing and for hay production than for growing cotton; hence an expansion of livestock production will result in the utilization of considerable land that is now idle and bringing in no return.

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